

or more, a hydrophilic binder in an amount of 50% by weight or less based on the amount of the fumed silica and at least one water-soluble polyvalent metal compound selected from the group consisting of a basic polyaluminum hydroxide compound and a water-soluble compound containing an element selected from the group consisting of titanium and zirconium.

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### REMARKS

Reconsideration and allowance of the subject application are respectfully requested.

Claim 1 has been amended as shown above by essentially incorporating the subject matter of claims 2 and 4. The amended claim recites a "basic" polyaluminum hydroxide compound which is supported in the present specification, including at page 9, lines 5-10 (particularly line 9) and page 23, Table 1, "Compound A" of the Recording sheets 1 to 4. No new matter has been added.

The applicants respectfully traverse the rejection of claims 1, 2 and 6-11 under 35 USC 103(a) over Saito et al. (or, presumably Mochizuki et al., USP 6,238,784, since there are several referrals to this reference). These references do not make the presently claimed invention to be obvious.

Preliminarily, the applicants point out that one of the most important features of the presently claimed invention is using a specific water-soluble polyvalent metal compound selected from the group consisting of a basic polyaluminum hydroxide compound and a water-soluble compound containing an element selected from the group consisting of titanium and zirconium (as recited in the above amended claim

1).

With respect to the cited references, the Office Action references disclosure in Saito et al. and Mochizuki et al. stating that the surface of the fine silica particles prepared in the gas-phase method may be modified with cations, for example, inorganic salts such as Al, Ca, Mg and Ba at column 4, lines 62-65 of Saito at column 3, line 64 to column 4, line 2 of Mochizuki.

Amended claim 1 of the present application recites a basic polyaluminum hydroxide and thus the a water-soluble aluminum compounds of Saito and Mochizuki do not read upon the presently claimed invention. By using such a specific water-soluble polyvalent metal compound as recited in presently amended claim 1, in at least one of the ink-receptive layer, good characteristics such as water fastness, light fastness and glossiness, or less surface defects such as surface crack can be obtained as shown in Table 1 on page 23 and Table 2 on page 26 of the present specification.

In Table 1 on page 23, when Recording sheets 1-4 and 6-9 of the present invention and Recording sheet 5 using aluminum chloride as Compound A which is now out of the scope of amended claim 1 are compared to each other, the ink-jet recording sheets of the presently claimed invention have good characteristics as shown in Table 2 on page 26 of the present application. In contrast, the ink-jet recording sheet using aluminum chloride as disclosed in Saito or Mochizuki, water resistance is not so good as compared to those of the samples of the present invention as shown in Table 2 of the same.

Accordingly, the applicants submit that the presently claimed ink-jet recording sheet is no where disclosed, suggested or made obvious by the teachings of Saito et al. or Mochizuki et al. The presently claimed invention is fully allowable under

Section 103(a) in view of the cited references.

The applicants respectfully traverse the rejection of claims 1, 2, 4, 6-11 and 14-16 under 35 USC 103(a) over either of Kasahara et al. or Ohbayashi et al. in view of either of Shaw-Klein et al. or Waller et al.

One of the objects of the presently claimed invention is to overcome the serious problems (see page 2, line 9 to page 3, line 2 of the present specification) of gloss, the feel of the material, water fastness and cockling when fumed silica is used in the ink-receptive layer by adding a water-soluble polyvalent metal compound to the ink-receptive layer.

Kasahara et al. discloses an ink-jet recording sheet comprising a water-resistant support, and a recording layer containing inorganic fine particles such as fumed silica, a hydrophilic binder such as polyvinyl alcohol, a water-soluble cation mordant and a hardening agent such as boric acid or a borate provided on the support. In Kasahara, however, there is neither disclosure about the water-soluble polyvalent metal compound nor the problem of cracking which is a specific problem when fumed silica having fine particle size is used in the ink-receptive layer. Accordingly, the applicants submit that a person of ordinary skill in the art would not be motivated to consult Kasahara when contemplating the presently claimed invention.

Obayashi et al. discloses an ink-jet recording sheet having a support and an ink absorption layer provided on the support, having a specific center line average roughness (Ra). That is, in Obayashi, by making Ra of the ink absorption layer 4  $\mu\text{m}$  or less, cracking at the time of preparation thereof is prevented.

As discussed above, with respect to the presently claimed invention, the occurrence of cracking is prevented by adding the water-soluble polyvalent metal

compound.

Thus, the presently claimed invention and Obayashi are quite different from each other in the means for preventing the occurrence of cracking. The applicants submit that a person of ordinary skill in the art would not be motivated to consult Kasahara when contemplating the presently claimed invention.

The Office Action refers to disclosure in Shaw-Klein et al. which states that the addition of a small amount of a multivalent metal salt to the image-recording layer enhances color rendition for certain dyes (see reference at column 4, lines 28-35). Waller et al. discloses that the metal salt is soluble in water for both preparing solutions and during imaging, but not after complexing with the dispersing aid that surrounds the pigment particles in the ink (as disclosed in the reference on page 13, lines 11-13 and 22-23). Thus, both of Shaw-Klein and Waller have the goal to heighten color rendition or durability of an image by an interaction between the dye or pigment in ink jetted to an ink-jet recording sheet and the polyvalent metal salt in the ink-jet recording sheet.

However, cracking of the ink-receptive layer which is the problem addressed by the presently claimed invention, occurs irrespective of the presence of ink. That is, cracking to be solved by the present invention occurs at the time of drying a coated ink-receptive layer, which is quite irrelevant to a stage of forming an image by jetting ink.

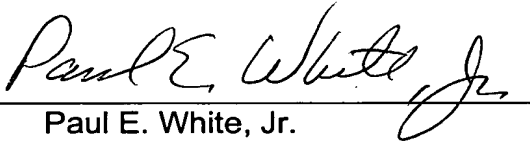
Accordingly, the action and the effect of the polyvalent metal compound of the present invention and those of Shaw-Klein or Waller are basically quite different from each other. The applicants submit that a person of ordinary skill in the art would not be motivated to consult Shaw-Klein or Waller when contemplating the presently claimed invention

In consideration of the above, the applicants submit that the presently claimed invention is not made obvious by the teachings of Kasahara et al. or Obayashi et al. in view of either of Shaw-Klein et al. or Waller et al. The presently claimed invention is fully allowable under Section 103(a) in view of the cited references.

In view of the above, it is believed that this application is in condition for allowance and a Notice to that effect is respectfully requested.

Respectfully submitted,

Manelli Denison & Selter, PLLC

By   
Paul E. White, Jr.  
Reg. No. 32,011  
Tel. No.: (202) 261-1050  
Fax No.: (202) 887-0336

2000 M Street, N.W.  
Seventh Floor  
Washington, D.C. 20036  
(202) 261-1000

**APPENDIX**

**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE CLAIMS:**

**Proposed Amendments To Claim 1 Showing Deletions And Insertions.**

Claim 1. (Thrice Amended) An ink-jet recording sheet which comprises a water resistant support and at least one ink-receptive layer provided on the support, wherein at least one of the ink-receptive layer contains fumed silica fine particles having an average primary particle diameter of 20 nm or less in an amount of 8 g/m<sup>2</sup> or more, a hydrophilic binder in an amount of 50% by weight or less based on the amount of the fumed silica and at least one water-soluble polyvalent metal compound selected from the group consisting of a basic polyaluminum hydroxide compound and a water-soluble compound containing an element selected from the group consisting of titanium and zirconium.